

The Monthly Evening Sky Map

A JOURNAL FOR THE AMATEUR—FOUNDED BY THE LATE LEON BARRITT
—NORTHERN AND SOUTHERN HEMISPHERE—

ALSO A STAR, CONSTELLATION AND PLANET FINDER MAP
ARRANGED FOR THE CURRENT MONTHS—JULY - AUG. - SEPT.
MORNING AND EVENING—AND PRACTICAL ANYWHERE IN
THE WORLD

Largest Circulation of any Amateur Astronomical Journal in the World

Entered as second class matter, at Shohola, Pennsylvania, under the act of March 5, 1879



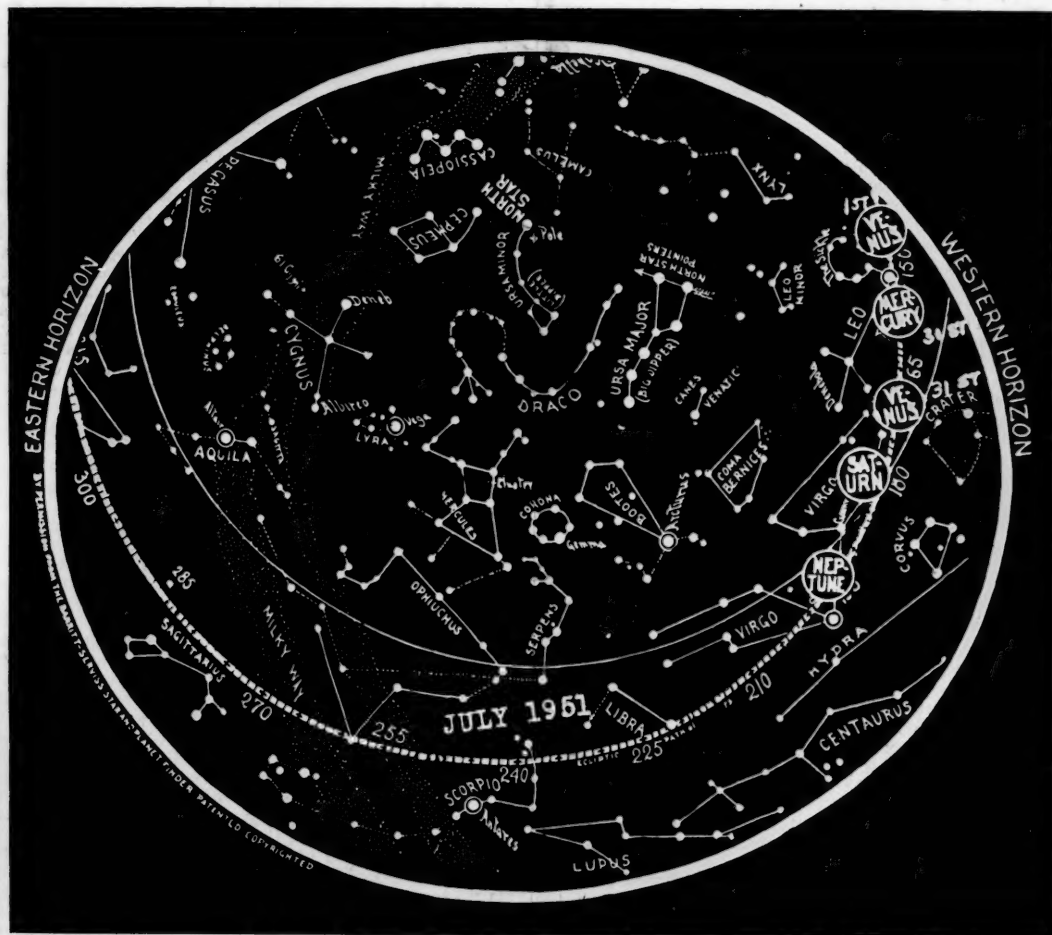
VOL. XLV, No. 469

SHOHOLA, PA. JULY—AUGUST—SEPTEMBER, 1951

\$2.00 PER YEAR
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EVENING SKY MAP FOR JULY

NORTH



SOUTH

Face South And Hold The Map Overhead. The Top North And You Will See The Stars And Planets Just As They Appear In The Heavens. The Arrow Through The Two Stars In The Bowl Of The Big Dipper Points To The North Star. The Star At The End Of The Little Dipper.

AT 9:00 P. M., JULY 1; 8:00 P. M., JULY 15; 6:30 P. M., JULY 31.

This map is arranged specifically for Latitude 40 North—New York—but is practical for ten or fifteen degrees north or south of this latitude anywhere in the United States, the southern portion of Canada and the northern portion of Mexico and for corresponding latitude in Europe.

THE RED PLANET MARS

By HENRY M. HYDE

Reprinted by Popular Request

With the single exception of earth's companion globe, the moon, no member of the sun's scattered family has aroused so much interest in the oldest of all the sciences, astronomy, as has the ruddy planet Mars, the fourth in order of distance from the great solar ruler. This is due largely to the extensive publicity our neighbor world has received during the last three or four decades, publicity given because of the expressed belief of certain astronomers that it is, or has been, the abode of sentient beings, perhaps like ourselves. A dominant characteristic of the human family is that it is profoundly interested in LIFE and everything pertaining thereto. So when the announcement was made by one of the keenest observers of the celestial bodies that he had become convinced the red planet actually is now, or at least has been, inhabited even the least interested of earth's population found in that statement something to attract attention. The thought that Life in some of the myriad forms it takes on is elsewhere existent has lent fascination to the study not only of the Martian globe itself but of the Universe, as well.

The globe we inhabit is the third from the sun, its distance from that luminary being approximately ninety-three million miles. Mars comes next, its distance from the sun being close to one hundred forty-one million five hundred thousand miles. Although our planet and Mars are always at varying distances from each other, due to different rates of motion along their separate orbits, they periodically arrive at positions where the intervening gulf is just a little wider than thirty-five million miles. Astronomically speaking, that interval is but a step; however, were it possible to fly across it at the constant speed of two miles a minute an aviator would spend thirty-five years on the trip! Aided by such close contacts, the astronomer has discovered that the Martian planet possesses certain characteristics that almost duplicate earthly features and conditions. Mars has an atmosphere, but it is so deficient in oxygen, for instance, it is thinner than that which surrounds earth's most elevated areas. Even so, there is enough moisture for snow to form and cover areas similar to earth's snowy regions.

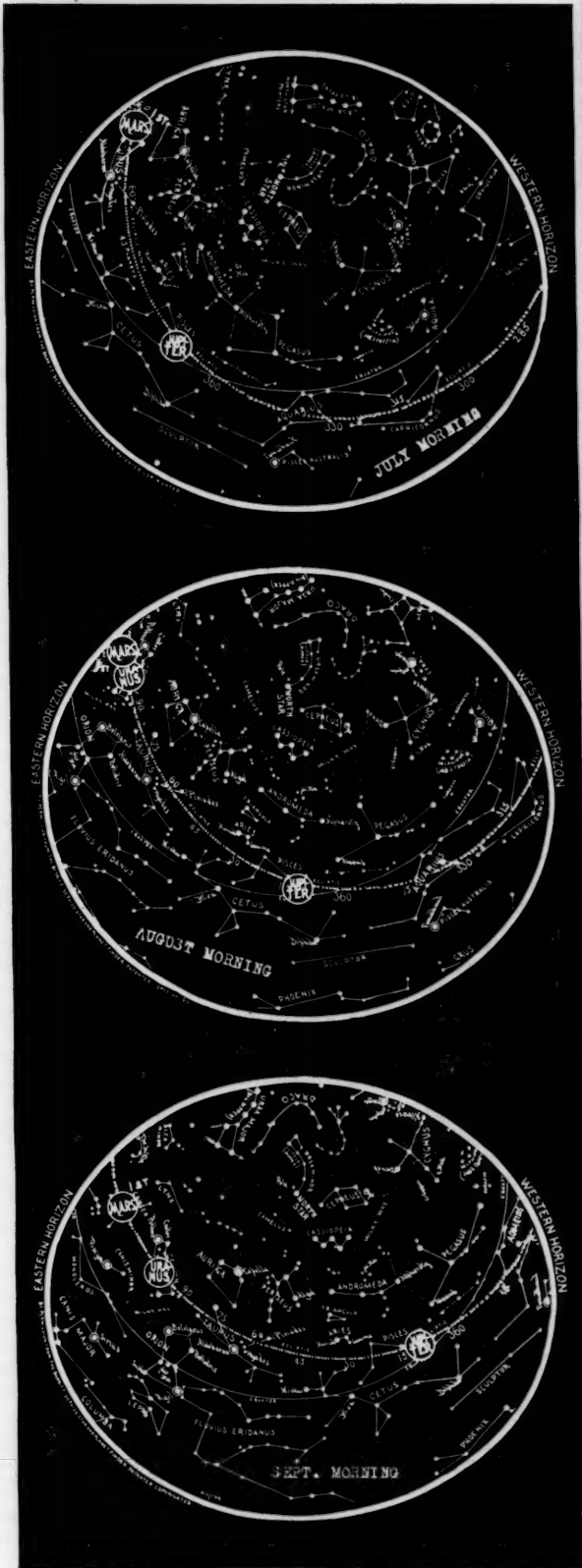
Because Mars rotates on an axis that is tilted from the vertical only a little more than one degree of arc beyond our planet's $23\frac{1}{2}$ deg. tilt, its seasons resemble, in type, those of the earth; but due to the larger orbit, covered in six hundred eighty-seven days at the speed of sixteen miles a second, each Martian season is nearly twice as long as those of the earth, or a little less than six months. This, it is thought by some, indicates that Mars possesses vegetable life requiring long periods for its growth. It is well known that for growth and maturity of vegetation on earth more or less definite amounts of solar radiation, such as heat, light and other types of energy, are necessary. This may be supplied within a comparatively brief growing-season, as in Alaska and other high-latitude sections of our globe where sunshine is almost continuous throughout the brief summer, or over a longer period, as in the temperate zones. It is easy therefore to understand the need of a doubly long season for the growth and maturity of vegetation on a world where solar light and warmth are only one-half that received by the earth. Although the intensity of solar radiations received by Mars is approximately one-half as strong as that our globe receives, due to the greater distance from its source, it seems to be sufficient to dissipate the blanket of white so thoroughly that as spring comes on only diminutive discs of white eventually remain to mark the polar regions.

In the southern hemisphere, a little removed from the polar cap, a luminous speck lingers all through the long summer. One might conclude that it is a solitary mountain peak, crowned with eternal snow. So far as can be observed it is the only elevated section of the planet; apparently, mountains do not exist. If they ever have reared their crests above the Martian plains the swinging blade of Time has mowed them down exactly as it is doing here on earth.

It is evident that the Martian surface is, to a very great extent, a vast desert whose oxidized sands reflect a reddish hue, except where great numbers of rather faint lines and spots, in a variety of sizes and shapes, change the aspect. These spots mark the intersection of

long and fairly straight lines, extending in various directions, and crossing each other like a net. Most of the lines are single, but a few are in pair, many of them extending to distances of one or more thousand miles. These slender markings are the so-called "canals", always mentioned when Mars is being discussed. To call these lines "canals" is not entirely correct, since to be visible even in the larger telescopes each must be at least fifty miles wide. It is the accepted belief of many astronomers that these lines and spots actually are belts and oases of some kind of vegetation whose existence is made possible by systems of canals and ditches, fed by snow-water from polar regions. As clouds in the Martian sky are seldom to be seen it follows that whatever types of vegetation are present, the requisite moisture must be supplied as indicated instead of by rain. That being the case, it is but natural to wonder whether these water-channels are of natural formation, or do they suggest human activities? Although we may never be able to solve the enigma, analogous reasoning may produce a satisfactory conclusion for all who are interested in Nature's activities on other worlds. You have noticed, undoubtedly, that on our planet the natural water-courses extend in graceful curves; seldom are straight lines in evidence, even where short distances only are involved. Note the windings of the mountain stream and the banks of rivers as their rippling contents glide toward the sea, and when that vast expanse is reached behold how the incoming waves hurl their waters back upon shores that bend in arching splendor as far as the eye can see. But man when he digs his canals or constructs his railroads and highways always adopts the straight line so far as the contour of the land permits. For this reason one might conclude that the Martian lines actually owe their origin to human agencies. Be that as it may, we cannot help wondering why there should be vegetation of any sort on such an inhospitable planet as Mars, a world where the highest temperature seldom reaches seventy degrees. That the so-called canals, or lines, are areas of vegetation of some sort is evidenced by the changes in appearance they present, especially in spring and autumn. It has been observed that as the blanket of snow recedes, with the advent of spring, the lines and spots gradually invest themselves with the green-tinted livery they are to wear during the growing-season and until autumn shall dye them with the dull browns that remind one of the frost-touched vegetation of our own planet.

So far as it applies to the earth, it is evident that vegetation, while serving to beautify the landscape to a marked degree, is intended primarily for the support of animal life. This being the case would it be wrong to assign similar uses for vegetation on Mars? Of course the Martian vegetation needs to be of an exceedingly hardy type, for it has to withstand very low temperatures between sunset and sunrise, but that does not prove that those extensive belts are not of life-sustaining material. Earth presents myriads of examples of the Creator's ability to produce forms of life, animal and vegetable, capable of withstanding in comfort existent temperatures. If cast into the sea the human animal would soon succumb to the cold there present; and yet, it is the habitat of a tremendous population adapted to the conditions which there exist. Could we visit the Martian planet, it is possible that we would find intelligent beings so constituted they would perish were they to come to earth. But, of course, this is merely speculative; no one knows whether or not Life is thereon present in animal form. We can only speculate. Even though human beings may not now be there present, we should not conclude that in ages gone by that Mars, only half the size of earth, could not have been the habitat of people somewhat like ourselves, for there is reason to believe that it once traveled an orbit much closer to the sun than the present orbit; this because of the sun's diminishing gravitational pull. It is well known that the sun is losing its mass, through transformation into energy, at the unbelievable rate of two hundred and fifty million tons each minute. With such a prodigal outpouring it follows that a slight diminution of its pulling power is slowly taking place. However, since the sun is so massive it will continue its existence for millions upon millions of years, so do not be in the least alarmed. It is quite evident there was a time when the solar orb was of much greater mass than now, so exerted a more pronounced gravitational



pull; this would indicate it held its scattered family of planets on orbits less distant than those of the present. While the eminent English astronomer, Jeans, mentions nothing regarding the other planets' orbits he has stated that the earth's orbit every century increases its diameter by about three feet. If this is actually the case it follows that all planets are receding from the solar ruler in ratios corresponding to their masses and the shrinking mass of the sun. Based upon such a condition one can easily visualize Mars as long ago moving in an orbit somewhat nearer the great source of light and warmth, and therefore was better adapted to the support of animal life as we know it.

As Mars undoubtedly become habitable long before our globe was in condition to support human life or any of the higher types of animals we might assume that it already has reached the evening of its existence, and that the possible inhabitants find the providing of nourishment a serious matter. What would be more natural than that they should seek the tropical and the lower sections of the temperate zones where the greatest warmth and other physical comforts, such as they are, could be the more easily obtained. It is within these zones that the apparent vegetation seems to be the most abundant.

Everything that lives must, for a suitable period, pass from under the sun's electronic flood in order that the spent energies of the day may be recuperated. In our case this has been provided for through earth's rotation, thereby bringing night and the opportunity for uninterrupted sleep. The comparatively slow rotation of the ruddy planet on its axis, once in 24 hrs., 37 min., 22 sec., gives the Martians their chance to recover from the arduous duties connected with the wrestling of a livelihood under seemingly adverse conditions. This provision might be considered to be an additional basis for the belief that our neighbor world is now, or has been, the abode of physical organisms.

Many times the question has been asked regarding the possibility of conversing with the Martians, if such people exist. While loth to consider anything impossible in this marvelous age of ours, I doubt that audible inter-communication can take place. This opinion is based upon the supposition that man is unable to successfully combat vocally the streams of energy always pouring from the sun. The generally futile efforts of shouting against the wind might illustrate how ineffective even man's generated forces must be when directed against the sun. Seemingly the Martians would always meet with this obstacle, since the earth when most favorably situated is between their planet and the sun. On the other hand, there are times when man-created impulses might mingle with the solar streams of energy, if they can escape earth's gravitational pull, and so reach the ruddy planet. Thus, for all we know to the contrary, there may be times when the inhabitants of the Martian world listen, with keen enjoyment, to some appealing melody from a radio orchestra, and, hearing, will understand, for music is the universal language—the vibrant language of the soul.

TOO HARD FOR THE ASTRONOMERS

Betelgeuse is the star in the constellation of Orion, which, according to the measurement of Prof. A. A. Michelson, has a diameter 300 times as large as that of the sun.

Men have pronounced the star "beetle goose" and "battle guess" and "bet a goose" and "beat a goose."

One day the word was pronounced several different ways at a meeting which Prof. Michelson attended.

"How do you pronounce that word, Prof. Michelson?" someone asked, turning to him. "Nobody here seems to know."

"I don't know," said the man who measured it. "I always get around saying it by using the astronomical word, 'Alpha Orionis.'"

The correct way to pronounce the word is as if spelled Bet-el-guz.—Kansas City Star.

\$2.00 Per Year. Postpaid in the United States
PUBLISHED QUARTERLY

Subscriptions received by Booksellers and Opticians everywhere
Canada \$2.00; Foreign \$2.00

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Please make checks payable to "The Monthly Evening Sky Map".
Copyright by Maria Barritt
Box 3, Pike County, Shohola, Pa.
Telephone Milford 2310

Vol. XLV. Shohola, Pa., July—Aug.—Sept., 1951 Whole No. 469

AMATEUR'S FORUM

July, 1951

By IRVING L. MEYER, M. S.

THE SUN: travels from Gemini into Cancer, following a course aiming toward the south and east. It is farthest from the earth the 4th at 94.5 million miles.

THE MOON: is at apogee (farthest from the earth) the 2nd at 253,000 miles and the 30th at 252,000 miles; at perigee (closest to the earth) the 14th at 223,000 miles.

The Moon's Phases (E. S. T.):

New Moon	July 4 at 2:48 A.M.
First Quarter	11 at 11:56 P.M.
Full Moon	18 at 2:17 P.M.
Last Quarter	25 at 1:59 P.M.

MERCURY: races from Gemini through Cancer and into Leo. The last few days of the month it will be visible just after sunset, low in the west. It will be a little brighter than a standard 1st magnitude star. Geocentric distance is decreasing, and on the 1st is 122 million miles, against 87 million miles the 31st.

VENUS: crosses Leo during the month, as a brilliant evening star. Greatest brilliancy, the 29th, is -4.2 , on which date the planet appears only one-quarter illuminated — a crescent-shaped object 38" in diameter, easily discernible in even small telescopes. Distance the 1st is 61 million miles; the 31st, 40 million miles.

MARS: moves from Taurus into Gemini, in the morning sky, but is too close to the Sun for satisfactory observation. Distance the 15th is 235 million miles.

JUPITER: is assuming prominence in the evening sky, rising before midnight from a point in Pisces. At the middle of the month it is 437 million miles from the earth, exhibiting apparent diameter of 42", and magnitude -2.1 .

SATURN: holds forth in Virgo, setting well before midnight. It will soon leave the night sky. On the 15th, distance is 919 million miles and magnitude is 1.3.

URANUS: In Gemini, is in the morning sky but too close to the Sun for convenient observation. Distance the 15th is 1843 million miles. Of interest to telescope users would be the conjunction of Uranus with Mars on the 19th. Mars will be about 26' north of Uranus, magnitude 2, and apparent diameter 3.7"; Uranus will be 3.5" in diameter, but magnitude 6'. A power of 50 diameters will show both planets at the same time as two identical discs, but Mars brighter and orange-colored, whereas Uranus will be dull greenish.

NEPTUNE: is in Virgo, north of Spica, and still observable. In the telescope, a 100-times magnification will reveal this 8th magnitude planets dull, grayish, $2\frac{1}{2}$ " diameter disc. Distance the 15th is 2821 million miles.

AMATEUR'S FORUM

August, 1951

By IRVING L. MEYER, M. S.

THE SUN: moves from Cancer into Leo, moving toward the south at an increasingly rapid pace. Distance is increasing, from 94.3 million miles the 1st to 93.8 million miles the 31st.

THE MOON: is closest to the earth the 14th at 225,000 miles and is farthest the 26th at 252,000 miles.

The Moon's Phases (E. S. T.):

New Moon	August 2 at 5:30 P.M.
First Quarter	10 at 7:22 A.M.
Full Moon	16 at 9:59 P.M.
Last Quarter	24 at 5:20 A.M.



Orbits and Heliocentric Movements of the Planets for July, 1951

NOTE: The planets are shown in their respective orbits. Two positions, one for the first, and one for the last day of the month, are given for Mercury, Venus and Mars. The arrow indicates the last day of the month. Jupiter, Saturn, Uranus and Neptune are shown in the mean position for the current month.

MERCURY: covers a short path in Leo all month, and is in the evening sky until inferior conjunction with the Sun on the last day. It is observable low in the west just after sunset for a few days around the 3rd, when greatest elongation east, $27^{\circ} 19'$, takes place. Magnitude then is 0.6, it is half illuminated, as seen from the earth and apparent diameter is 7". Minimum geocentric distance occurs the 28th at 58 million miles.

VENUS: also covers a short arc in Leo not far east of Mercury. Venus, however, is much brighter than Mercury, but this month its motion is carrying it rapidly between the Sun and the earth, so that on the 1st we find magnitude -4.2 , diameter 40", distance 39 million miles, and percent illuminated 23; on the 31st, magnitude is -3.3 , diameter 58", distance 27 million miles, and 2% illuminated. Venus will appear as an extremely thin crescent particularly toward the close of the month, and since this planet will be about 9° south of the Sun, it will be observable in the telescope in full daylight (setting circles will be required). Note that the crescent will extend more than half way around the disc of the planet, as a result of sunlight shining through the planet's atmosphere.

MARS: moves from Gemini into Cancer in the morning sky. Too close to the Sun for satisfactory observation. Distance the 15th is 230 million miles.

JUPITER: in Pisces, is approaching opposition, rising shortly after sunset. On the 15th, magnitude is -2.3 equatorial diameter is 46", polar diameter 43" (the flattening of the disc at the poles will be noticeable in even small telescopes), and distance 397 million miles. The four brightest satellites are visible with the most modest optical aid.

SATURN: is still in Virgo but no longer well situated for observation as it is being overtaken by the Sun rapidly. In the evening sky setting shortly after dark. Distance the 15th is 957 million miles.

URANUS: in Gemini, can be seen in the late morning sky, just before sunrise. A 6th magnitude object, however, it is barely visible to the naked eye. Will be better situated later in the year. Distance the 15th is 1822 million miles.

NEPTUNE: sets early in the evening, from Virgo. Not well placed for observation any longer. Distance the 15th is 2866 million miles.

AUGUST STARS AND CONSTELLATIONS

In midsummer evenings, when all the world is out of doors, the heavens, although less brilliant with great constellations than in winter, are very attractive. A few of the first magnitude are then better situated for observation than at any other season.

Almost directly overhead glows the beautiful Vega in the constellation Lyra. In brightness it is above the average of first magnitude stars, while the brilliancy of its blue-white rays is almost unrivalled. To appreciate the color of Vega it should be examined with a glass. A good opera-glass shows it well, but, of course, a telescope is better. In the telescope the disk of the star appears like a core of white fire encircled with a glare of bright blue flame. If the eye piece is put a little out of focus the splendor of the display is increased. When examining Vega thus with a glass it is very interesting to turn from it to its great yellow-white rival Arcturus, which appears high in the western part of the sky, in the constellation Boötes. Arcturus is also very beautiful on account of the glare surrounding its disk in the telescope, but this glare, in striking contrast to that of Vega, is of a rich golden red hue. In a word Vega resembles a diamond of the most resplendent blue-white tint, while Arcturus is like a great, deep-tinted topaz. Both are suns of enormous magnitude, exceeding our sun at least a thousand times in actual brightness. Directly east of Vega lies the striking figure of the Northern Cross in the constellation Cygnus. The beam of the cross follows the current of the Milky Way, its head being marked by the bright star Deneb, and its foot by the beautiful double-star Albireo. Directly west of Vega is seen the constellation Hercules, the central part of which consists of a quadrilateral figure with a star at each corner. Following the course of the Milky Way toward the south from the Northern Cross one comes to the little constellation Aquila, called the "Eagle of the Winds." It has several remarkable stars, one nearly of the first magnitude. Altair, with a smaller attendant on each side. Below Aquila the Milky Way becomes very brilliant, passing underneath Ophiuchus and Serpens, and reaching the southern horizon between the tail of Scorpio and the feet of Sagittarius, the Archer. A large and brilliant part of the stream is diverted through the center of Scorpio. The latter constellation lies near the southwestern horizon, its brightest star the red Antares resembling Altair in having an attendant star on either hand. Near the horizon in the southeast appears the relatively inconspicuous constellation Capricornus, Aquarius, Scorpio, Sagittarius, Capricornus and Aquarius are all zodiacal constellations, that is to say, they lie in the zodiac, the broad band encircling the heavens, and having the ecliptic for its central line. In the east the great square of Pegasus is seen rising, and in the northeast starting from the corner of the square runs a line of second magnitude stars which are the chief brilliancy of Andromeda, the Chained Maiden. On the west side of the pole is the Great Dipper with the handle uppermost, and, as if balanced against it, on the east side of the pole one sees Cassiopeia, whose five brightest stars imitate the figure of an irregular letter "W." Directly above the pole and below Vega and Hercules is the head of Draco, the great starry serpent of the north, which, making a double curve, extends its tail to a point between the bowl of the Great Dipper and the pole.

One of the most important "showers" of meteors, or shooting stars, occurs on the 10th and 11th of August. Its center of radiation is from the constellation Perseus which rises in the northeast about 10 P. M. One should watch until midnight for these meteors, and an attentive observer is sure to see several, and perhaps many, in the course of an hour.

Page Five



Orbits and Heliocentric Movements of the Planets for August, 1951
NOTE: The planets are shown in their respective orbits. Two positions, one for the first, and one for the last day of the month, are given for Mercury, Venus and Mars. The arrow indicates the last day of the month. Jupiter, Saturn, Uranus and Neptune are shown in the mean position for the current month.

PLANETARY CONFIGURATIONS

Eastern Standard Time

July, 1951

July 2—4:00 AM	Conjunction, Uranus and Sun
July 3—12:00 AM	Mercury greatest heliocentric latitude north
July 3—2:34 AM	Conjunction, Mars and Moon; Mars south 4° 11'
July 3—10:39 PM	Conjunction, Uranus and Moon; Uranus south 4° 10'
July 4—4:00 PM	Earth in aphelion
July 5—2:40 AM	Conjunction, Mercury and Moon; Mercury south 1° 56'
July 5—10:00 AM	Quadrature Jupiter and Sun
July 8—3:27 AM	Conjunction, Venus and Moon; Venus south 0° 34'
July 9—3:00 PM	Quadrature, Neptune and Sun
July 10—10:36 AM	Conjunction, Saturn and Moon; Saturn north 4° 9'
July 11—11:27 PM	Conjunction, Neptune and Moon; Neptune north 5° 10'
July 12—7:00 AM	Venus in descending node
July 19—6:00 PM	Conjunction, Mars and Uranus; Mars north 0° 26'
July 24—7:19 AM	Conjunction, Jupiter and Moon; Jupiter south 4° 47'
July 26—11:00 AM	Mercury in descending node
July 29—1:00 AM	Venus greatest brilliancy
July 31—8:02 AM	Conjunction, Uranus and Moon; Uranus south 4° 9'
July 31—10:39 PM	Conjunction, Mars and Moon; Mars south 3° 15'

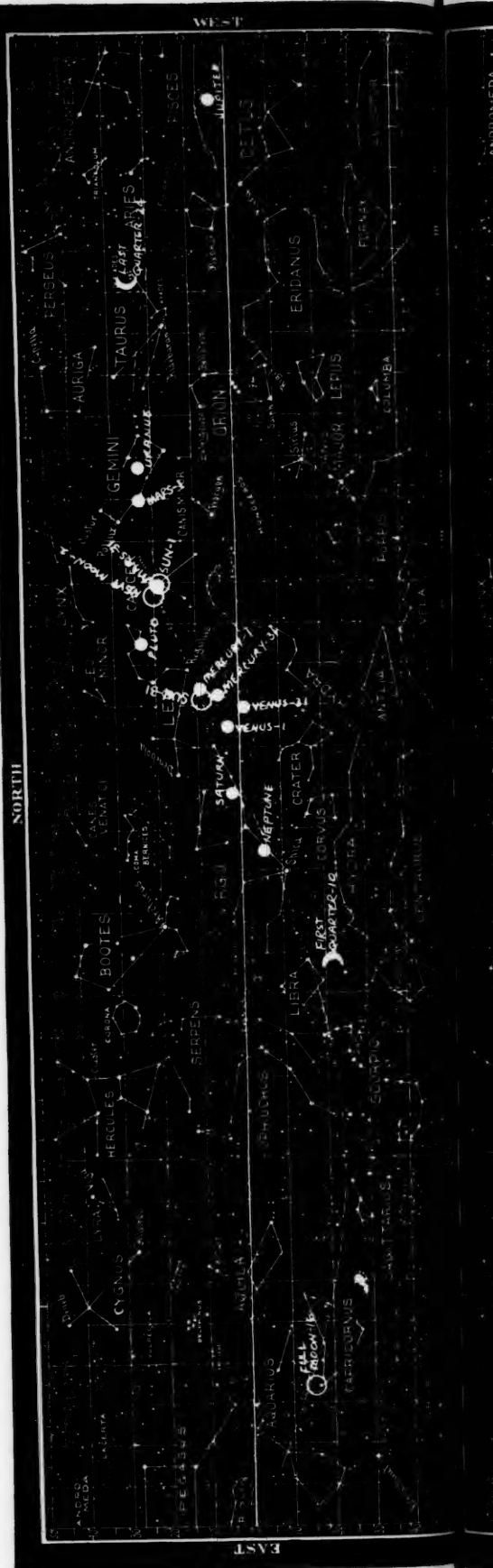
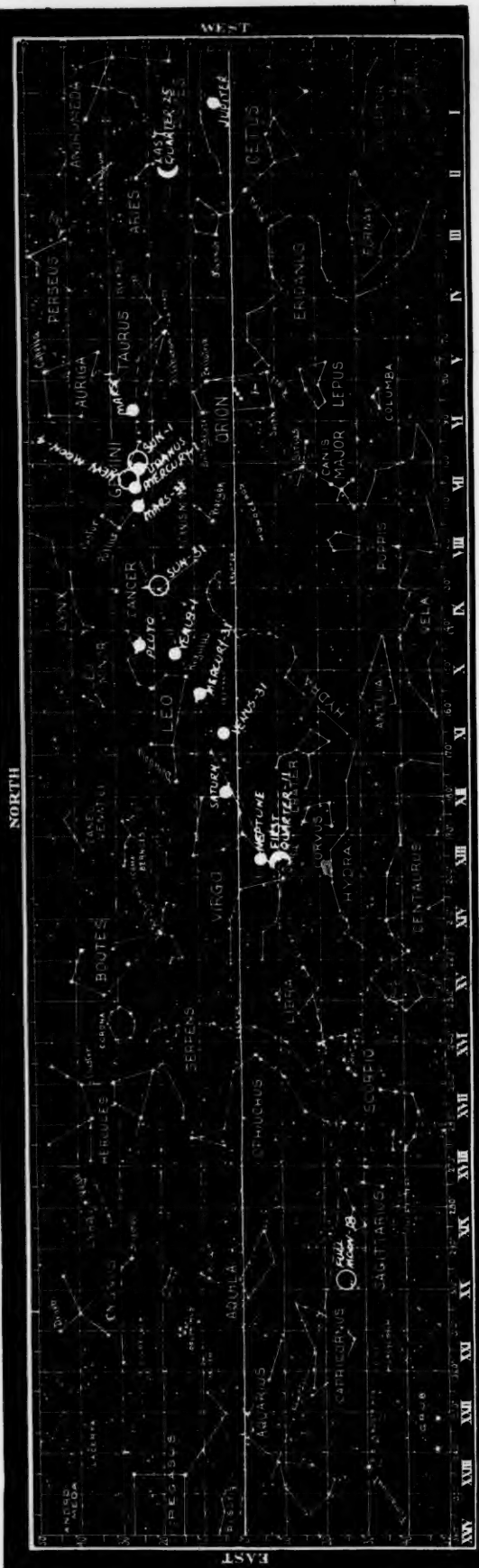
PLANETARY CONFIGURATIONS

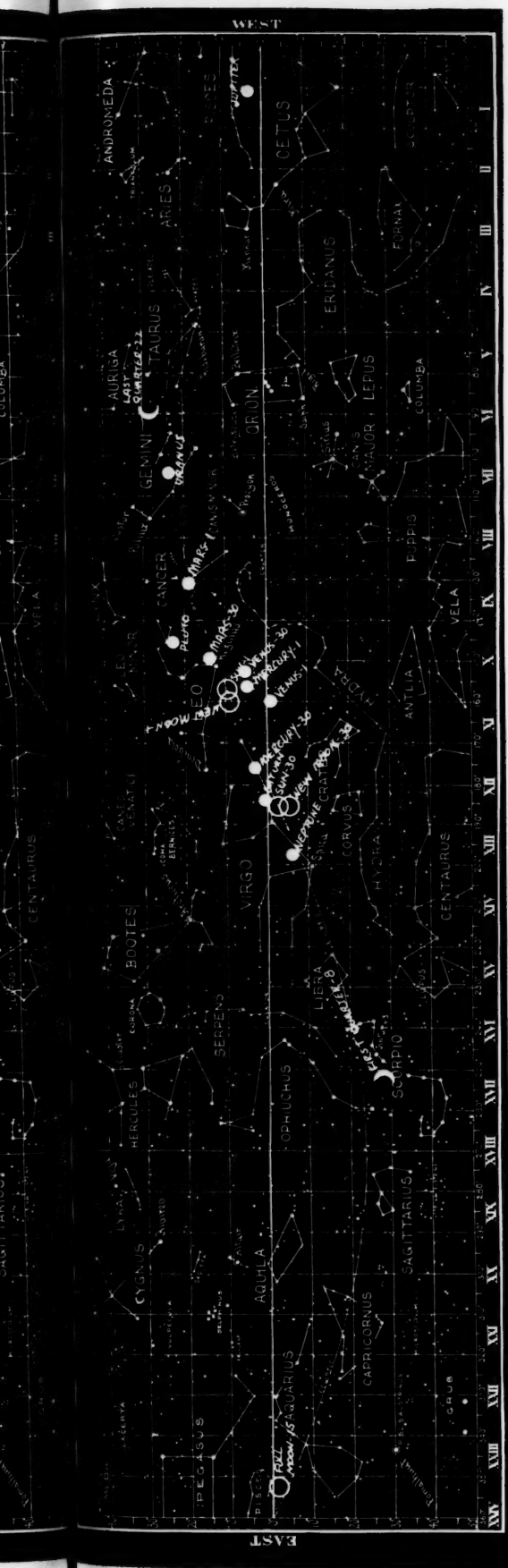
Eastern Standard Time

August, 1951

Aug. 3—2:00 PM	Mercury greatest elongation east, 27° 15'
Aug. 4—4:00 PM	Jupiter stationary in Right Ascension
Aug. 5—1:45 AM	Conjunction, Mercury and Moon; Mercury south 2° 1'
Aug. 5—3:54 PM	Conjunction, Venus and Moon; Venus south 3° 41'
Aug. 5—5:00 PM	Mercury in aphelion
Aug. 6—8:37 PM	Conjunction, Saturn and Moon; Saturn north 4° 27'
Aug. 8—6:01 AM	Conjunction, Neptune and Moon; Neptune north 5° 21'
Aug. 10—7:00 PM	Venus stationary in Right Ascension
Aug. 12—5:00 PM	Conjunction, Pluto and Sun
Aug. 15—5:00 PM	Venus in aphelion
Aug. 16—4:00 PM	Mercury stationary in Right Ascension
Aug. 20—3:58 PM	Conjunction, Jupiter and Moon; Jupiter south 5° 1'
Aug. 26—1:00 AM	Mercury greatest heliocentric latitude south
Aug. 27—5:45 PM	Conjunction, Uranus and Moon; Uranus south 4° 8'
Aug. 29—6:56 PM	Conjunction, Mars and Moon; Mars south 1° 52'
Aug. 31—3:00 AM	Inferior conjunction, Mercury and Sun; Mercury south 4° 2'

A MERCATOR PROJECTION OF THE STAR FIELD FOR 50 DEGREES NORTH AND 65 SOUTH OF THE EQUATOR
 The Star Field makes an apparent complete revolution westward every 24 hours, hence the hourly division from I to XXIV, but this has no relation to the actual revolution of the earth in the world.
 Practical as a Star, Constellation and Planet Finder for the current months—July-August-September.
 Showing also the position of the Sun at the beginning and ending of the month and the position of the Moon at it's several Phases.





Nov. 5
Oct. 22 Oct. 5 Sept. 20 Sept. 5 Aug. 20 Aug. 5 July 20 July 5 June 20 June 5 May 20 May 5 Apr. 20 Apr. 5 Mar. 20 Mar. 5 Feb. 18 Feb. 2 Jan. 20 Jan. 5 Dec. 20 Dec. 5 Nov. 20
THE DATE BELOW EACH NUMERAL WILL SHOW WHEN THAT SECTION OF THE MAP WILL BE ON THE MERIDIAN—DUE SOUTH—AT 9 P. M. OR AN HOUR EARLIER FOR EACH NUMERAL WEST OF THIS DATE AND AN HOUR LATER FOR EACH NUMERAL EAST.

5000 PLANETOIDS

Planetoids stray from their beaten path
To venture uncomfortably near to Earth

By ROBERT TOREN

The spinning, blue Earth grew larger as the stray planetoid Hermes hurtled toward it. A few doubtful moments, then the planetoid curved and rushed by, clearing by only 400,000 miles. Earth sank in the distance, and Earthlings did not even know of its passing until Dr. Karl Reinmuth photographed it Oct. 28, 1937, when it had already receded to 800,000 miles.

If Hermes had not missed, its blow would have been without warning. Suddenly a blazing streak would split the sky, exploding into dazzling flame. Smothering black clouds would mushroom up to blot the skies, then deafening thunder would roar and rage from its midst, shaking the Earth. If it had struck a sea, mighty waves spattered by the impact would spread, drowning the coasts. Had a continent been below, Hermes would have buried itself deep, jarring down the nearby cities. Hot, raging winds would blast the ruins and then in the following deathlike stillness, beneath a dusky, clouded sky, men would unite to relieve their unhappy fellows.

If Hermes had only grazed the Earth, it would have shattered and buried part where it struck, the rest skidding clear at a reduced speed. Helpless men would pray that it did not stay under Earth's influence, looping back to the point of collision to repeat the tragedy. But due to Luna's disturbing influence, Hermes would probably miss Earth on its return and gradually release itself, finally making off again on its interrupted wanderings.

All the planetoids combined have a total mass much less than that of Earth, so Hermes could not deal it bodily damage though it would seriously threaten the life which it found below it. Earth has been scarred by solar bodies that did not miss, and the Chicago scientists Chamberlin and Moulton even go so far as to picture the primeval Earth as being much smaller than it is now, gradually being built up by a great and early fall of planetesimal matter, of which he planetoids are the sole survivors. Happily, the only planetoids that may possibly crash into Earth today are the smallest of the family, as yet unknown.

Hermes, its orbit changed as it swooped so near to Earth, has been swallowed up in space, perhaps beyond recovery.

The planetoids are not coming inward, closing in on the Earth, but due to the close watch kept, many which a few years ago would have flitted by unnoticed, are now recorded. Eros, coming within 16,000,000 miles of Earth, was the closest photographed until March 12, 1932 when M. Delporte at Brussels found another which cut 4,000,000 miles from its record, and the new body was suggested as having broken off from elongated Eros. Just five weeks later, before its nearness was realized, a second astronomer, Dr. Reinmuth, found another planetoid even closer. This one, with a daily motion so rapid observers had trouble keeping their instruments trained on it, came from beyond Mars, swept inward, passing Earth and clearing by about 6,750,000 miles, and continued inward crossing the orbit of Venus. It came so much closer than any had come before that it was suggested that it had been hurled from Earth when Earth was in volcanic torment, or from Luna, when its internal fires still shook its blackened, distorted exterior.

Planets from Venus to Uranus Know them

In 1857, when less than 50 planetoids were known, an American astronomer, Daniel Kirkwood, inferred that they were not spread uniformly between Mars and Jupiter. Continued additions to their numbers proved that gaps were partially cleared and continually thinning out at distances where the periods of the planetoids would make them pass Jupiter repeatedly at the same points in their path. Consequently the accumulated disturbances pulls the planetoids out of those spaces. Two planetoids squads, the famous Trojan group of ten, escort the major planet. One squad files in unchanging order ahead of Jupiter and the second brings up in the rear, minute honor guard to the mightiest of planets.

Three planetoids have already revealed themselves as they followed Eros beyond their natural borders, passing Mars, passing Earth, and in one case, looping slightly beyond Venus. On their other border, Jupiter sees many

stream past it, and for many years one small planetoid, Hidalgo, was known to venture boldly as far as Saturn. Then ten years ago another faint body was caught headed out beyond Uranus on a solitary trek of over 34 years. "Exceptional cases," allows Prof. E. A. Fath, "may still be discovered which will increase the width of the asteroid belt."

When Pluto was identified after a search lasting 15 years, it was smaller than Lowell had estimated it must be to account for its affect on Uranus. Whereupon, recalling that likewise the first of the planetoids was smaller than expected, astronomers wondered if Pluto might be only the nearest member of a new group of planetoids. They searched for other scattered bodies outside Neptune; once Dr. F. C. Henroteau of the Dominion Observatory thought he had found a second, but his was the only cry of discovery raised and it was taken back after further observation. If like Ceres, the distant Pluto has countless companions, they elude all present attempts to detect them.

While scanning photographs, a worker at the Lick Observatory found near the eighth moon of Jupiter a minute object sharing the same apparent motion. Dr. H. M. Jeffers announced it as a possible tenth moon, cautioning, however, that it might be a planetoid of unusual motion passing near. Observers at Lick followed it carefully. Disappointed, they watched it head away from Jupiter, just a minor planet. On the other hand, Miss Leavitt missed credit for discovering the sixth moon of Jupiter because she dismissed it as a planetoid.

Occasionally these bodies may venture so near a planet that they lose their freedom. One, Alinda, which comes near the Earth, also passes so near to Jupiter that this greater world may pull it from its orbit and force it to pay homage along with its present family of eleven. Hidalgo, as it passes Jupiter on its way toward Saturn, crosses its orbit at a high inclination or it would likewise be in danger. The retrograde motion of the outer satellites of Jupiter and Saturn suggest they have been captured, which their diameters allow. Even Mars, which is much smaller than Earth, holds two tiny moons in thrall, possibly drawn from the nearby planetoids.

Earth may add new moons to sky

The distant Pluto, suspects R. A. Lyttleton of Cambridge, may have been a second moon of the giant Neptune, and though at present on its own, edges close enough to Neptune eventually to be captured again or to be propelled off to new fields, possibly nearer Earth. Once it was commonly held that Luna was flung inward due to some Uranian accident, happily not striking Earth directly but coming near enough to be captured. Tidal waves drowned the continents as it was halted on its inward course to become the companion of Earth. This theory has dropped out of favor, and an accompanying theory, even more startling, has not received astronomical backing. Before Luna was captured, according to Bellamy, the Aztecs record a former moon as setting behind Atlantis, thus going backward through the sky. It was destroyed, he interrupted from the folklore of ancient peoples, in a worldwide catastrophe.

Among the thousands of planetoids recorded on plates now filed away, further scanning may yet reveal creeping about Earth itself other faint, distant moons. It is barely possible that Adonis as every 18 years it comes within about 1,500,000 miles of Earth, might gradually be drawn from its orbit and forced into an uncertain course about the Earth, much complicated by the nearness of the far greater Luna. Out beyond Luna, a planetoid may be captured, held a captive satellite for a while, and then again free itself to continue as a planetoid, in a continuous process of exchange.

Until Eros strayed close to earth the planetoids had few astronomers to befriend them. They were objects so small and so distant that their individuality was hidden, and they were considered as a monotonous, numberless group. But now that some of the bolder have partly bridged the gap that lies between, we can greet them as friends as they swoop suddenly out of space and pass by, alarming but fascinating little planets.



Orbits and Heliocentric Movements of the Planets for Sept., 1951

AMATEUR'S FORUM

By IRVING L. MEYER, M. S.

September, 1951

THE SUN: moves from Leo into Virgo, and distance decreases from 93.8 to 93.0 million miles. The Sun crosses the equator into the southern heavens on the 23rd, marking the equinox.

There will be an annular eclipse of the Sun on the 1st, the path of the annular phase running across large stretches of Africa, to Madagascar. As a partial, the eclipse will cover the eastern half of Canada and the United States, Central America, the northern tip of South America, all of Africa, the British Isles, Western Europe, and Western Arabia.

THE MOON: is at perigee the 11th (228,000 miles) and at apogee the 23rd (251,000 miles).

The Moon's Phases (E. S. T.):

New Moon	September 1 at 7:49 A.M.
First Quarter	8 at 1:16 P.M.
Last Quarter	22 at 11:13 P.M.
New Moon	30 at 8:57 P.M.

MERCURY: is in the morning sky all month, moving from Leo into Virgo. It will reach greatest elongation west of the Sun, 17° 53', on the 16th, and will be best observable around that date. Look close to the eastern horizon in the early dawn twilight for a bright, yellowish object. Magnitude is -0.3. Distance is increasing — from 59 million miles the 1st to 118 million miles the 30th.

VENUS: is in inferior conjunction with the Sun on the 3rd, in Leo. As indicated in the August AMATEUR'S FORUM, Venus will be nearly 9° south of the Sun at conjunction, and though only 1% illuminated, will be visible in a circle-equipped telescope, the objective of which is shielded from the direct rays of the Sun. Naturally, observation is restricted to daytime. However, by the end of the month, Venus will be an easy object in the pre-dawn sky. Minimum geocentric distance is 26.5 million miles on the 4th, and apparent diameter then is 59" — the largest diameter of any planetary object in the sky.

MARS: moves from Cancer into Leo, as a second magnitude object in the morning sky. Can be seen easily shortly before dawn, but is still so remote that it is not a striking object. Distance decreases from 225 to 213 million miles.

JUPITER: a brilliant object in Pisces, this great planet is fast approaching opposition. It rises shortly after dark, and remains above the horizon the rest of the night, On the 15th magnitude is -2.4 and distance

is 371 million miles.

SATURN: is in Virgo, and on the 29th is in conjunction with the Sun, thereafter appearing in the morning sky. Too close to the Sun all month to be observable. Maximum distance, the 29th, is 979 million miles.

PLANETARY CONFIGURATIONS

Eastern Standard Time

September, 1951

Sept. 1—	Annular eclipse of Sun
Sept. 1—12:48 AM	Conjunction, Mercury and Moon; Mercury south 4° 39'
Sept. 1— 7:27 AM	Conjunction, Venus and Moon; Venus south 9° 23'
Sept. 3— 8:16 AM	Conjunction, Saturn and Moon; Saturn north 4° 43'
Sept. 3—10:00 AM	Interior conjunction, Venus and Sun; Venus south 8° 35'
Sept. 4—12:54 PM	Conjunction, Neptune and Moon; Neptune north 5° 25'
Sept. 7— 4:00 AM	Venus greatest heliocentric latitude south
Sept. 8— 5:00 P.M.	Mercury stationary in Right Ascension
Sept. 12— 8:00 AM	Conjunction, Mercury and Venus; Mercury north 8° 21'
Sept. 14— 2:00 AM	Mercury in ascending node
Sept. 16—11:00 AM	Mercury greatest elongation west, 17° 53'
Sept. 16— 9:04 P.M.	Conjunction, Jupiter and Moon; Jupiter south 4° 54'
Sept. 18— 5:00 PM	Mercury in perihelion
Sept. 23— 2:00 AM	Venus stationary in Right Ascension
Sept. 23— 3:38 P.M.	Sun enters Libra; equinox
Sept. 24— 3:24 AM	Conjunction, Uranus and Moon; Uranus south 4° 3'
Sept. 27— 3:32 PM	Conjunction, Mars and Moon; Mars south 0° 1'
Sept. 27—11:40 PM	Conjunction, Venus and Moon; Venus south 7° 7'
Sept. 28—11:00 PM	Mercury greatest heliocentric latitude north
Sept. 29— 6:00 AM	Conjunction, Saturn and Sun
Sept. 29— 3:31 AM	Conjunction, Mercury and Moon; Mercury north 3° 46'
Sept. 30— 9:59 PM	Conjunction, Saturn and Moon; Saturn north 5° 0'

THE HEAVENS IN SEPTEMBER

The bright Capella, in Auriga, is now nearly North-East, and well above the horizon; to the right of it we see Perseus; below which will be noticed the Pleiades, low down on the horizon, which shows us that Taurus is about to make its appearance for the winter months. Above Perseus is Cassiopeia, and above, and to the left of Cassiopeia, is Cepheus, now nearly overhead; the branching of the Milky Way near α (Alderamin) is well worthy of notice.

Aries is to the right of the Pleiades; while above it is Triangulum and Andromeda. Pegasus, which has attained a fair elevation, is now between the East and the South-East; the Great Square is still tilted up, Scheat being nearly above Algenib; below the Square Pisces will be seen—this constellation, which is not a very conspicuous one, consists of two fishes linked together by a ribbon, the one fish lies parallel with the bottom side of the Square of Pegasus, and the other with the left side of the Square. Below Enif, in Pegasus, is Aquarius, now at a fair height above the horizon, while to the right of the Water-Bearer is Capricornus, now nearly South.

(Some years ago astronomers were startled by the sudden appearance of a conspicuous star to the left of Arid in the Swan, in a place where no star had been visible to the naked eye before. This strange star was first noticed by Professor Schmidt of Athens, on the 24th of November, 1876; it obtained the same brightness as a star of the third magnitude, and then gradually faded away, and disappeared, till it required a telescope to reveal it. With regard to it Webb, in his "Celestial Objects," says:—"These stars were the first of the host of heaven to reveal to Bessel, in 1838, the secret of their distance. This is, probably, 366,400 times that of the earth from the sun—itsself 92,400,000 miles—a space so vast that the light which reaches us from the sun in 8 minutes, employs nearly 6 years to traverse it. . . . How vast must be the dimensions of this great Universe! What a temple for the Creator's glory! 'All the whole heavens are the LORD'S'—those heavens are crowded with millions of millions of stars; and of all that countless multitude, millions, probably, for one, are at a distance incalculably exceeding that of 61 Cygni!")

Between the South and the South-East Sagittarius

will be seen setting; and to the right of it is Ophiuchus rapidly approaching the horizon. Serpens is to the right of Ophiuchus; while above the head of the Serpent is Hercules. The brilliant Vega, in Lyra, has now passed the South, and is gradually sinking lower in the heavens.

To the right of Hercules is Corona Borealis, and further in the same direction is Bootes, its leading star Arcturus being to the right of the West, and near the horizon.

In the North-West we see Cor Caroli, and above it the Great Bear, which is now nearing the North, but not like other constellations to disappear below the horizon, for, as Homer mentions, it is "denied to slake its beams in Ocean's briny baths" or, in other words, to set or sink below the horizon. Above Ursa Major is Draco, which has now fallen away from overhead; to the right of Draco will be seen the Little Bear; the Guardians of the Pole being to the right of Polaris.

* In his description of the shield of Achilles, on which there was engraved—

"The Heaven, the Sea,

The Sun that rests not, and the moon full-orb'd.

There, also, all the stars which round about

As with a radiant frontlet bind the skies,

The Pleiades and Hyades, and the might

Of the huge Orion, with him Ursa cauda,

Known also by his popular name, the Wain,

Which wheeling round the Pole still looks toward

Orion; only star of these denied

To slake his beams in Ocean's briny baths."

SLIDES FOR LECTURERS AND TEACHERS

Yerkes Observatory at Williams Bay, Wisconsin, is now offering a new selection of one-hundred 3-1/4 x 4 inch slides for the use of teachers and lecturers. Twenty-one entirely new photographs from the Yerkes collection are included in this set. A set of one-hundred descriptive cards—a card corresponding to each slide—is available also, in revised form.

For fifty years the Yerkes Observatory has maintained a growing collection of astronomical photographs available for purchase by the public. Most of the more-than-2,000 photographs have been taken by such past and present members of the Yerkes staff as Barnard, Ritchey, Ross, Struve, Hale, Hubble; Kuiper; Van Biesbroeck; Morgan and Page. They have been taken with instruments at the Yerkes Observatory in Wisconsin at the Mount Wilson Observatory in California, and at the McDonald Observatory in Texas.

During the past year the collection has been revised and re-catalogued by Dr. Thornton Page. Many new photographs have been added, some of them from Harvard's southern station at Bloemfontein, South Africa, from the Lowell Observatory in Arizona, from the High Altitude Observatory in Colorado, and from other sources through the *Astrophysical Journal*, published by the University of Chicago Press. A new illustrated catalogue lists and describes the collection.

For many years a set of one-hundred slides, with corresponding descriptive cards, selected from the total collection of photographs has proved invaluable to teachers and lecturers. The present revision of this slide set includes, in addition to the earlier, classic photographs of astronomy, a series of photographs of the largest prominence yet photographed at the High Altitude Observatory (1946); the far ultraviolet solar spectrum obtained from a V-2 rocket 85 miles above the earth (1947); filtered and composite photographs of the planets taken by Barnard, Ross, and Kuiper, the photographs on which new satellites of Uranus and Neptune were discovered by Kuiper (1948-49); photographs of the Magellanic Clouds from the southern hemisphere; photographs of many famous nebulae and clusters; the latest scheme of accurate spectral classification (Morgan, 1950); and photographs of large refracting and reflecting telescopes. New diagrams of the solar system, of the Galaxy, and of the Russell-Hertzsprung plot of stellar luminosities and spectral types are also included. The descriptive cards (200 to

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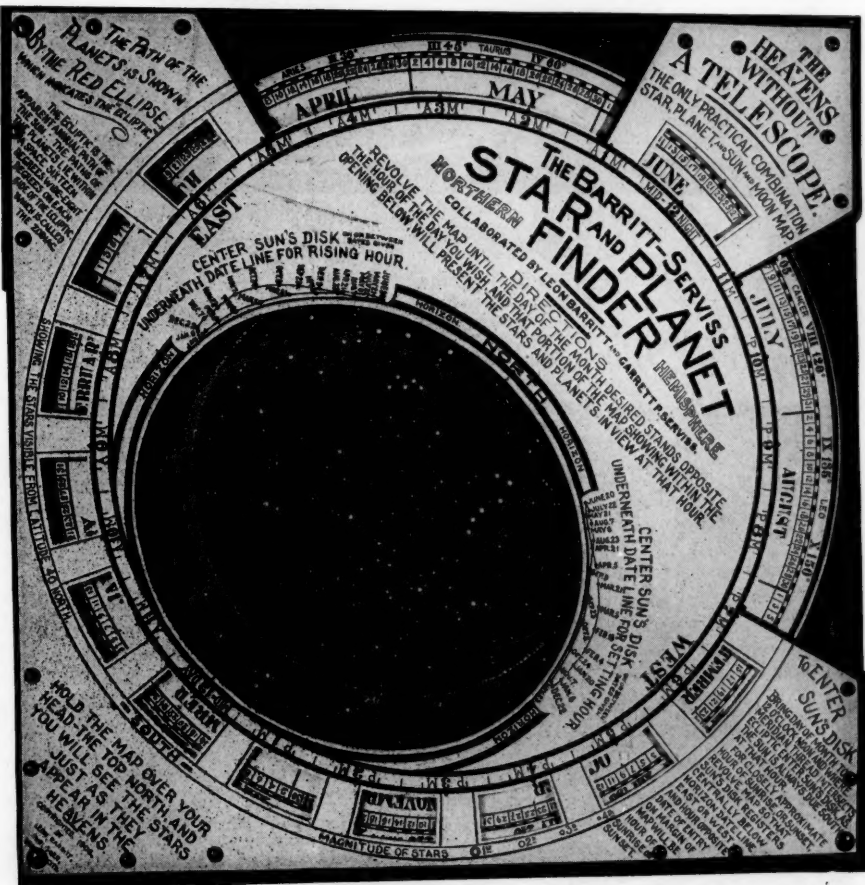
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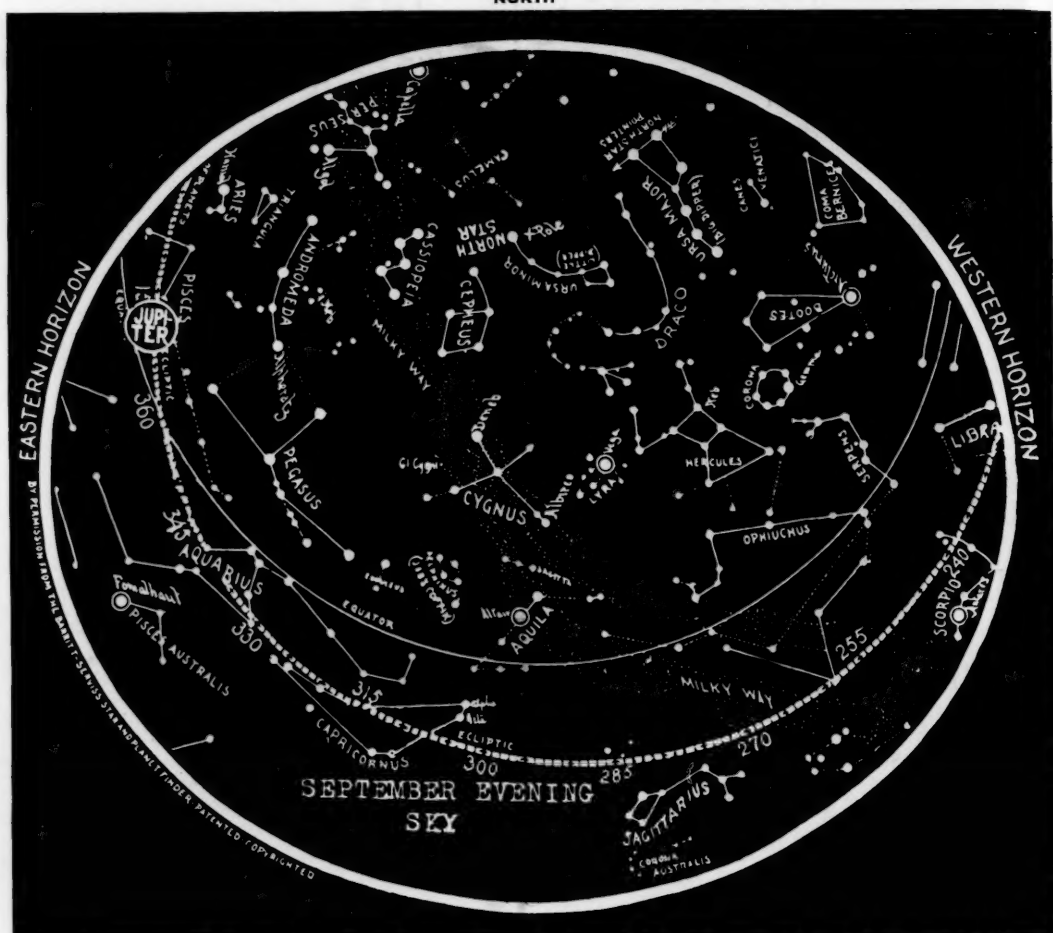
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EVENING SKY MAP FOR SEPTEMBER

NORTH



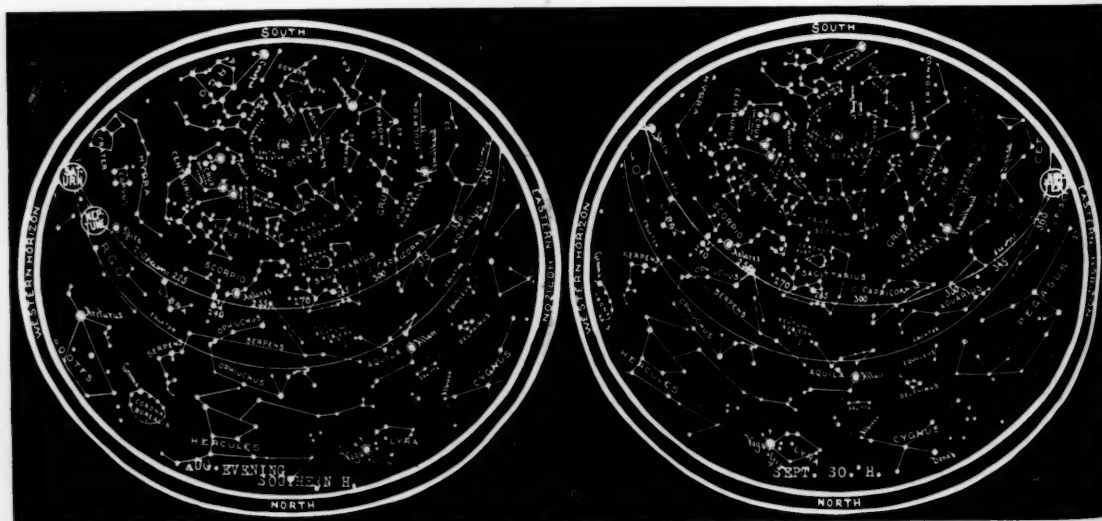
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This map is arranged specifically for Latitude 40 North—New York—but is practical for ten or fifteen degrees north or south of this latitude anywhere in the United States, the southern portion of Canada and the northern portion of Mexico and for corresponding latitude in Europe.

EVENING SKY SOUTHERN HEMISPHERE

EVENING SKY SOUTHERN HEMISPHERE



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